

ABSTRACT OF THE DISCLOSURE

A temperature regulation and flow control device is described. A web of material, e.g., for a wet suit, has a layer of gel particles embedded in a flow control layer, preferably a foam matrix. A water permeable neoprene layer covers the flow control layer and allows water to enter the suit. The flow of water in the suit is regulated by the expansion and contraction of the gel as it undergoes a volume phase transition in response to a change in temperature. When the diver is in cold water, the cold water enters the foam substrate and the gel expands, causing permeability (i.e., flow) to decrease. Flow is restricted in response to cooling, and the foam substrate expands and tightens the fit of the wet suit. In warmer water, an opposite effect occurs, whereby the gel contracts and flow increases. The gel contracts relaxing the fit of the suit. A gel having a particular volume phase transition critical temperature is selected in order to maintain body temperature in a particular environment. This technology also can be used to control temperature in other applications.